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WASHINGTON COLLEGE
CHESTERTOWN, MARYLAND 21620
DEPARTMENT OF CHEMISTRY

August 30, 1968

Mr. William H. Bryson
Action Manufacturing Company
RD #1, Box 197
Atglen, PA 19310

Re: Disposal of Pyrotechnic Waste and Rejected Devices

Dear Mr. Bryson:

Per our telephone conversation, I would like to summarize my professional opinion regarding the most effective method of disposing of waste pyrotechnic composition and rejected items. This topic has become an increasingly grave matter of concern in recent years, as strict limitations on open burning and waste disposal have been proposed or imposed by both federal and state regulations.

I have been involved in the field of pyrotechnics for over 16 years, and offer seminars on pyrotechnics annually at Washington College. I am the author of *The Chemistry of Pyrotechnics*, published by Marcel Dekker, Inc. in 1965. I have done consulting work in pyrotechnics for a number of companies and government agencies. Waste disposal is a topic that frequently comes up in my discussions with seminar attendees and consulting clients.

A recent manual on pyrotechnic operations offered this advice on waste disposal:

1. Waste materials shall be removed at regular and frequent intervals from all operating areas.
2. Waste materials shall be placed in containers designated as ordinary waste, and pyrotechnic or explosive material. Containers for these materials shall be distinguished by color designation and shall be properly labeled.

Fine, and good advice, but now what do you do with the waste?

There is only one safe, sure way to dispose - permanently and completely - of pyrotechnic scrap, and that is to burn it. In the "old days", pyrotechnic facilities either destroyed waste material in open burning pits or buried their scrap. Environmental considerations now

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preclude the burying technique, and open burning - if conducted - must be carried out only when environmental conditions are proper. The burn pit must be designed to preclude contamination of ground water, and the ash generated by such burning must be collected and disposed of properly.

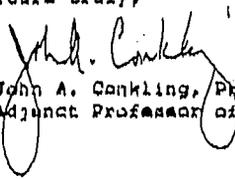
One solution actively being pursued is the development of efficient incinerators that consume scrap pyrotechnic material yet emit only environmentally acceptable gases and a minimum of particulates (smoke) into the atmosphere. This appears to be an ideal solution to the waste disposal problem, but the incinerators are expensive and their capacity is limited.

Until incinerator cost and technology permit the widespread availability of these units, there must be some "give" on the waste issue by environmental officers. Burning must be permitted on a regular basis. Scrap must not be allowed to accumulate - an incident is sure to result if it does, either in storage or when large quantities are disposed of at one time.

One other option that should be considered for the times when it might be practical and safe is the recycling of components. The high explosives industry has reused materials for years. Some materials - such as TNT - can be melted out of old units and then reloaded into new devices. Pyrotechnics provide some of a challenge to the recycler because they are intimate mixtures, and a difficult separation procedure may be required.

To summarize the disposal problem: Somebody's got to give until new technologies can be perfected and implemented. The alternative is to cease production and import everything. Open burning, conducted on limited quantities of material by personnel trained in the proper safety procedures and conducted in manner that minimizes the exposure of any hazardous residue to the environment, is the best short-term answer.

Yours truly,


John A. Conkling, Ph.D.
Adjunct Professor of Chemistry

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